



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,687	10/31/2003	Laurie S. Mittelstadt	200206643-1	9827

22879 7590 10/23/2006

HEWLETT PACKARD COMPANY  
P O BOX 272400, 3404 E. HARMONY ROAD  
INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER

CANTELMO, GREGG

ART UNIT PAPER NUMBER

1745

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/697,687	<b>Applicant(s)</b> MITTELSTADT ET AL.	
	<b>Examiner</b> Gregg Cantelmo	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 29-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 and 34-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>SEE OFFICE ACTION</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-28 and 34-44 in the reply filed on August 18, 2006 is acknowledged. Applicant's election with traverse in the reply filed on August 18, 2006 is acknowledged. The traversal is on the ground(s) that there is no serious burden of search between the distinctly claimed types of electrolytic fuel cells. This is not found persuasive because the search for one type of fuel cell comprising a particular electrolyte relative to a second type of fuel cell comprising a materially different type of electrolyte are not held to be obvious variants and the problems associated with a solid electrolyte are not identical to that of those problems associated with a liquid electrolyte, particularly with respect to the sealing requirements of each. Furthermore, there is no clear statement or evidence of record to show that each type of electrolyte is obvious over one another. Therefore the requirement is still deemed proper and is therefore made FINAL.

### ***Information Disclosure Statement***

2. The information disclosure statements filed October 31, 2003 and July 18, 2005 have been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Drawings***

3. The drawings received October 31, 2003 are acceptable for examination purposes.

### ***Claim Objections***

Art Unit: 1745

4. Claim 5 is objected to because of the following informalities: the term "opposite" should be "opposite". Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6-9, 11, 16-18, 20-23, 26-27 and 34-42 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 00/10216 A (WO '216).

WO '216 discloses a membrane electrode assembly including a substantially solid polymer electrolyte membrane 2 positioned between opposed catalyst layers 3, the polymer electrolyte membrane 2 having a dimension that is larger than a comparable dimension of at least one of the catalyst layers 3, such that the polymer electrolyte membrane 2 has an uncovered portion; and a gasket 4 attached to the uncovered portion of the polymer electrolyte membrane, wherein the gasket 4 extends beyond a periphery of the polymer electrolyte membrane 2 and wherein the gasket 4 is formed of a polymer material (page 10, ll. 25-29), said gasket 4 being configured to substantially prevent leakage of fuel or oxidant between an anode side and a cathode side of the membrane electrode assembly (Fig. 12 as applied to claim 1).

WO '216 teaches that the use of adhesives for adhering the gasket to the MEA, i.e., membrane electrode assembly 3/4/3 (pg. 11, ll. 7-10) and that the adhesive is FEP (pg. 16, ll. 5-9 as applied to claim 2).

According to the Example associated with Fig. 2 the subgaskets 4 are integrated with an adhesive (pg. 16, ll. 5-12 and Fig. 2 as applied to claim 3). Furthermore the structure of the sealed fuel cell of WO '216 is identical to that of the product of claim 3 and whether the adhesive is integral with either the gasket or MEA or a distinct layer between the two, the resultant gasket/adhesive/membrane structure of the prior art of WO '216 is identical to that of the instant claims and therefore is held to anticipate the claimed product.

The height of the gasket 4 is greater than the height of the catalyst layer in electrode 3 (Fig. 12 as applied to claim 4).

The dimension of the membrane 2 is greater than each electrode/catalyst layer 3 and has uncovered portions wherein first and second gaskets 4 are provided on opposing sides of the membrane (Fig. 12 as applied to claim 6). The inner gaskets 4 are attached to each other beyond the periphery of the membrane 2 (Fig. 12 as applied to claim 7).

The membrane can contain a plurality of uncovered portions as shown in Figs. 9a and 9b, about which the gasket is provided such as that gasket shown in Fig. 12 (as applied to claim 8). This gasket, as shown in Fig. 12 has first and second gaskets 4 attached to the two ends of the membrane and are further attached to each other beyond the periphery of the membrane (as applied to claim 9).

The membrane can contain a plurality of membrane electrode assemblies positioned in a substantially planar arrangement with respect to each other as shown in Figs. 9a and 9b, about which the gasket is provided such as that gasket shown in Fig.

Art Unit: 1745

12 (as applied to claim 11). This gasket, as shown in Fig. 12 has first and second gaskets 4 attached to the two ends of the membrane and are further attached to each other beyond the periphery of the membrane.

The apparatus of WO '216 linearly pertains to method of manufacturing the aforementioned fuel cell including: attaching first and second polymer gaskets 4 to opposing sides of the MEA 3/2/3 such that the gaskets 4 extend beyond the periphery of the membrane 2, and wherein the two gaskets 4 are attached, via pressure, to one another at a location beyond the periphery of the membrane (Fig. 12 as applied to claim 16).

WO '216 teaches that the use of adhesives for adhering the gasket to the MEA, i.e., membrane electrode assembly 3/4/3 (pg. 11, ll. 7-10) and that the adhesive is FEP (pg. 16, ll. 5-9 as applied to claims 17 and 18).

Additional fuel cells can be disposed in a common gasket sealing arrangement as shown in Figs. 9a and 9b (as applied to claims 20 and 21).

The membrane can contain a plurality of membrane electrode assemblies positioned in a substantially planar arrangement with respect to each other as shown in Figs. 9a and 9b, about which the gasket is provided such as that gasket shown in Fig. 12 (as applied to claim 22). This gasket arrangement includes attaching the gasket between the fuel cells (Fig. 9b as applied to claim 23).

WO '216 discloses means for providing fuel and oxidant to the fuel cell membrane electrode assembly; means 4 for providing containment between the fuel and oxidant in at least one area beyond a periphery of the membrane 2 wherein the

Art Unit: 1745

means comprises a polymeric seal material (page 10, ll. 25-29) which is attached to the MEA (Fig. 12 as applied to claim 26).

The membrane can contain a plurality of membrane electrode assemblies positioned in a substantially planar arrangement with respect to each other as shown in Figs. 9a and 9b, about which the gasket is provided such as that gasket shown in Fig. 12 (as applied to claim 27).

The apparatus of WO '216 linearly pertains to method of manufacturing the aforementioned fuel cell including: attaching first and second polymer gaskets 4 to opposing sides of the MEA 3/2/3 such that the gaskets 4 extend beyond the periphery of the membrane 2, and wherein the two gaskets 4 are attached, via pressure, to one another at a location beyond the periphery of the membrane (Fig. 12 as applied to claim 34).

A plurality of prefabricated openings can be provided in the gasket arrangement as shown in Figs. 9a and 9b (as applied to claim 35).

Each MEA is provided over a respective hole or opening in the gasket arrangement (Figs. 9a and 9b as applied to claim 36).

The gaskets are precut prior to using them in the process of manufacturing the fuel cell array. This is apparent from the disclosure found in the paragraph bridging pages 11 and 12 which state that the gaskets include cut-away regions to frame and provide requisite registration for the applied MEAs to the gasket. Furthermore and as shown in Figs. 9a, 9b and 12, the gaskets are provided with smaller pre-cut regions than the outer dimension of the electrolyte membrane (as applied to claims 37-40).

Art Unit: 1745

Each gasket is further taught to include an adhesive to improve adherence between the gaskets and membrane (pg. 11, ll. 7-10 and pg. 16, ll. 5-9 as applied to claims 41 and 42).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).



Art Unit: 1745

6. Claims 5 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '216 in view of U.S. Patent No. 6,127,058 (Pratt).

The teachings of WO '216 have been discussed above and are incorporated herein.

The difference between WO '216 and claims 5 and 19 is that WO '216 does not disclose providing electrode current collector plates attached to opposite sides of the gasket.

The concept of providing current collectors to the backsides of respective electrodes is well known in the art for the purpose of collecting the current generated by the fuel cell to provide said current to a particular load.

Pratt teaches of providing planar fuel cell arrays which include current collector assemblies 21/22 applied to opposing sides of the fuel cell arrangement (abstract).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '216 to provide current collector plates to each electrode on opposing sides of the fuel cell since it would have provided the means for drawing the current produced from the fuel cell so as to provide it to the load to which the fuel cell is electrically connected to.

7. Claims 10 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '216 in view of WO 99/52164 (WO '164).

The teachings of WO '216 have been discussed above and are incorporated herein.

The differences between WO '216 and claims 10 and 28 are that WO '216 does not disclose providing containment chambers (claim 10) or of the means for providing fuel containment comprising means for supporting a plurality of MEAs in a stacked arrangement (claim 28).

WO '164 teaches of a solid electrolyte fuel cell which has a sealed perimeter and wherein each electrode side includes a respective reactant chambers 104 and 108 to provide reactant flow entirely across their respective electrodes (Fig. 1 as applied to claim 10).

The motivation for providing containment chambers is to prevent reactant crossover.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '216 by providing respective reactant containment chambers on each electrodes side so as to effectively control the individual reactant flows and prevent reactant crossover.

WO '164 further teaches of providing a stacked arrangement in combination with particular containment chambers (Figs. 2-5).

The motivation for stacking the cells is to provide a particular total power output from the stack having a desired configuration dependent upon the load to which the fuel cell system is employed. WO '216 already recognized that plural cells can be used and while these cells are in a planar arrangement, providing an alternative stacked arrangement having the sealing and manifold structure as taught by WO '164 would have been well within the skill of the ordinary worker in the art.

Art Unit: 1745

8. Claims 12-15 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '216 in view of U.S. Patent Application Publication No. 2004/0220048 (Leban).

The teachings of WO '216 have been discussed above and are incorporated herein.

The anode sides of the fuel cells face the fuel manifold region and the cathode sides of the fuel cells face the oxidant manifold regions (as applied to claim 15).

The differences between WO '216 and claims 12-15 and 24-25 are that WO '216 does not disclose providing the plurality of assemblies in a stacked arrangement with respect to each other wherein the gasket is attached to the adjacent membranes (claims 12 and 24) of the gaskets being attached to the housing (claims 13 and 25) configured to separate the housing into a fuel containment chamber and oxidant containment chamber (claims 14 and 25).

WO '216 discloses providing a plurality of substantially planar fuel cells within a common gasket arrangement as discussed above and shown in Figs. 9A and 9B.

Leban teaches providing a plurality of joined fuel cells in an undulating stacked arrangement wherein the Z-folded strip has the fuel cells therein connected by sealing end portions (Fig. 9).

The motivation for providing the stacked arrangement of Leban is that it provides for a stacking arrangement for the strip of continuous fuel cells such as the strip of WO '216 shown in Figs. 9a and 9b. This stacked configuration provides a compact fuel cell stack structure compared to the planar arrangement. In providing the Z-fold

Art Unit: 1745

arrangement to the strip of fuel cells in Figs. 9a and 9b of WO '216, the gasket will provide sealing between the adjacent cells in the folded arrangement (as applied to claims 12 and 24). Furthermore respective fuel and oxidant manifolds are attached to opposing sides of the folded array and between terminal stack end plates. Thus providing a housing for the fuel cell stack and further providing respective reactant containment chambers on each side of the folded stack so as to isolate each reactant from one another (paragraphs [0032]-[0033] as applied to claims 13, 14 and 25).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '216 by providing the plurality of assemblies in a stacked arrangement with respect to each other wherein the gasket is attached to the adjacent membranes and wherein the housing provides for reactant containment chambers to each side of the stack of cells, as taught by Leban since it would have provided a compact fuel cell stack structure compared to the planar arrangement.

9. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '216 in view of as applied to claim 34 above and in further view of U.S. Patent Application Publication No. 2004/0220048 (Leban) and WO 2001/27501 A (WO '501).

The teachings of WO '216 have been discussed above and are incorporated herein.

The differences between WO '216 and claims 43-44 are that WO '216 does not disclose of cutting the gaskets into sections (claim 43) and bending the cut sections of the MEA to form a stacked fuel cell arrangement (claim 44).

Art Unit: 1745

WO '216 discloses of providing a plurality of substantially planar fuel cells within a common ePTFE gasket arrangement as discussed above and shown in Figs. 9A and 9B.

Leban teaches of providing a plurality of joined fuel cells in an undulating stacked arrangement wherein the Z-folded strip has the fuel cells therein connected by sealing end portions (Fig. 9). In order to facilitate bending of the gaskets, it would have been obvious to notch or slightly cut the gaskets to provide a bending characteristic without breaking the gasket arrangement. WO '501 shows cutting an ePTFE gasket in Fig. 1 to facilitate bending or folding of the gasket while reducing the stress of the bend on the ePTFE gasket.

The motivation for providing the stacked arrangement of Leban is that it provides for a stacking arrangement for the strip of continuous fuel cells such as the strip of WO '216 shown in Figs. 9a and 9b. This stacked configuration provides a compact fuel cell stack structure compared to the planar arrangement.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '216 by providing the plurality of assemblies in a stacked arrangement with respect to each other wherein the gasket is attached to the adjacent membranes and wherein the housing provides for reactant containment chambers to each side of the stack of cells, as taught by Leban since it would have provided a compact fuel cell stack structure compared to the planar arrangement.

The motivation for cutting the gaskets is to facilitate the bent configuration taught by Leban to the gasket and fuel cell arrangement in Figs. 9A and 9B of WO '216. WO '501 shows cutting an ePTFE gasket in Fig. 1 to facilitate bending or folding of the gasket while reducing the stress of the bend on the ePTFE gasket.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of WO '216 in light of the stacked configuration of Leban by notching or cutting the ePTFE gaskets between adjacent MEAs as suggested by WO '501 since it would have facilitated the bending of the gaskets in between adjacent MEAs to provide the Z-folded configuration of Leban and while also having reduced the stress of the bend or fold on the ePTFE gasket.

### ***Conclusion***

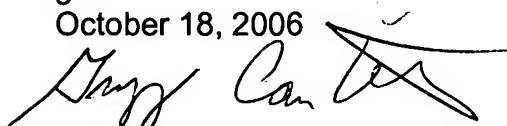
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

Art Unit: 1745

have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

gc

October 18, 2006

A handwritten signature in black ink, appearing to read "Gregg Cantelmo", with a stylized flourish at the end.

**GREGG CANTELMO**  
**PRIMARY EXAMINER**